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UNIVERSITY OF MARYLAND

COLLEGE OF ARTS AND SCIENCES

DEPARTMENT OF PHYSICS AND ASTRONOMY

MAILING ADDRESS:

ASTRONOMY PROGRAM
UNIVERSITY OF MARYLAND
COLLEGE PARK 20742

January 2, 1975

Dr. Joshua Lederberg
Stanford University Medical Center
Stanford, California 94305

Dear Dr. Lederberg:

In a year-end clean-up operation, your letter of September 19, 1974 surfaced. I profusely apologize for having forgotten all about it. I hope these few comments will still be timely.

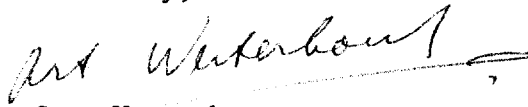
When writing the paper on "The Early History of Radio Astronomy" I did not set out to exhaustively compile the history of my field; although somewhat interested, as we all are, I am not a historian of science. Note my sources in the Acknowledgements to that paper. Hence, my comments are not based on any deep research. You are interested in the role of theoretical dogma in discouraging certain lines of experimental research, and ask why not other lines of evidence might have inspired a reexamination, especially in the light of advances in sensitivity. I suspect that the reason was the general conservatism of the astronomer. You will note that in radio astronomy astronomers were not involved at all until well after Jansky's discovery. Radio, and electronics in general, were an area so far removed from optics--and there was so much to do in the established fields--and the average observational astronomer had so little training in Physics--that astronomers were simply not interested. I believe that ~~Sebbins~~ at Lick was the only one dickering in photoelectric photometry in the entire period 1930-1945. And even in the late fifties one could still find extensive papers in the astronomical literature describing in detail amplifiers built for photometry--even though a college student in Physics or Electronics could have built one as an exercise! Note also that, with few exceptions, it was radio engineers and physicists who built up radio astronomy and dominated the field until the late fifties. And note how UV, X-Ray, Gamma-Ray astronomy are done by Physics-trained astronomers. The so-called "classical" astronomer simply never had the background nor the vision to use means other than those he had relied on for many years. And then there was the workload . . . So I believe it was simply a matter of others occasionally being interested in trying something out, and of course lately the tremendous supply of top physicists and the upsurge of astrophysics, that has given the impetus. And on your specific question: In 1930 it was still impossible to detect the Sun at radiowave lengths.

The answer to your second question, relating to the development of astronomy in 30 years, is simple: An enormous amount of data was collected, but in 1930 we were still baffled by the energy supply mechanism of the Sun. Nuclear reactions came into the picture around 1935, and stellar evolution as we describe it now is only 20 years old! In 1930 there was perhaps a *hint* that there might be interstellar gas other than in the bright nebulae. People were not sure that the dark clouds were dust or holes! So we were not nearly ready to think about other mechanisms where our ordinary stars gave difficulty.

I think that a field of science often progresses most by the interest and the unconventional approaches by scientists only peripherally connected with the field. It is those people who are not bound by dogma! When I am wondering whether astronomy is "really moving faster in the 1970's," I have exactly that in mind. Physics has entered Astronomy in a big way, and the results are manifold. But are these not basically due to application of known techniques? How many brand-new areas do we see opened? I don't know the answer. It looks hopeful, but my question mark means to say: let's wait until the end of the decade. I am not so much worried about support (although support for unconventional things is usually hard to come by as it is against dogma). Rather shall I be interested to see what happens when the new big data-gathering race comes to an end. Will someone piece it all together?

I hope you'll get something out of this rambling letter. Happy 1975!

Sincerely,

A handwritten signature in cursive script, reading "Gart Westerhout", with a long horizontal flourish extending to the right.

Gart Westerhout
Professor of Astronomy

GW:nmr